We claim:

1. Form X olanzapine characterized by a melting point in the range from 187°C to 191°C.

2. Form X olanzapine characterized by a small peak at about 11.05 d-spacing units in its powder x-ray diffraction pattern.

3. Form X olanzapine of claim 1 having a powder x-ray diffraction pattern with characteristic peaks at about 11.05, 9.98, 6.24, 6.13, 3.75, 3.61, 3.53, 3.43 and 2.67 d-spacing units.

4. Form X olanzapine of claim 3 having a melting point of 187°C to 190°C.

5. Form X olanzapine of claim 4 having a melting point range of 189°C to 190°C.

6. Form X olanzapine of claim 5 having a powder x-ray diffraction pattern with characteristic peaks at about 11.05, 9.98, 6.24, 6.13, 3.75, 3.61, 3.53, 3.43 and 2.67 d-spacing units.

7. Form X olanzaping of claim 4 having a powder x-ray diffraction pattern with characteristic peaks at about 11.05, 9.98, 6.24, 6.13, 4.83, 4.71, 4.57, 4.48, 4.39, 4.32, 3.84, 3.75, 3.61, 3.53, 3.43, 2.95, 2.86, 2.67, 2.43 and 2.36 d-spacing units.

8. Form X olanzapine of claim 5 having a powder x-ray diffraction pattern with characteristic peaks at about 11.05, 9.98, 6.24, 6.13, 4.83, 4.71, 4.57, 4.48, 4.39, 4.32, 3.84, 3.75, 3.61, 3.53, 3.43, 2.95, 2.86, 2.67, 2.43 and 2.36 d-spacing units.

9. Form X olanzapine of claim 4 further characterized by the absence of powder x-ray diffraction peaks at about 10.2 to 10.3 d-spacing units.

10. Form X olanzapine of claim 4 further characterized by the absence of powder x-ray diffraction peaks in the range from 8.0 to 8.9.

11. Form X olanzapine of claim 4 further characterized by the absence of powder x-ray diffraction peaks at 4.98 or 4.94 d-spacing units.

12. Form X olanzapine of claim 4 further characterized by the absence of powder x-ray diffraction peaks at about 10.2 to 10.3, in the range from 8.0 to 8.9, or at 4.98 or 4.94 d-spacing units.

13. Form X olanzapine of claim 2 having a melting point range of 189°C to 190°C.

14. A process for preparing crystalline olanzapine which comprises crystallizing olanzapine from an aqueous crystallization solution of a lower aliphatic ketone of the formula C_1-C_3-C(O)-C_1-C_3.

15. A process of claim 14 wherein the lower aliphatic ketone is acetone or methyl ethyl ketone.

16. A process of claim 15 wherein the aqueous crystallization solution contains the lower aliphatic ketone and water in a ratio of from about 4:1 to about 1:1.

17. A process of claim 16 wherein the ratio is about 2:1.

18. A process of claim 14 wherein the crystalline olanzapine is Form X olanzapine.